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AN ATTEMPT
TO IMPROVE The METHOD OF ARMING TRADING VESSELS.

With
A Deſcription of the CARRONADE,
and ſome HINTS concerning SHOT.

The THIRD EDITION.

FALKIRK:
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M,DCC,LXXIX.

BRITISH MUSEUM

AN ATTEMPT TO IMPROVE The METHOD OF ARMING TRADING VESSELS.

AMONG the advancements of military ſcience in theſe highly commercial kingdoms, and during the preſent critical ſituation of foreign traffic; to combine the Art of Marine War with the views of mercantile ſpeculation, and to join the powers of defence to the other properties of merchant ſhips, upon a plan of profitable adventure and convenience, ſeems an object of national importance.

ARMING of Trading Veſſels has never been treated as a ſcience, from obſtacles in adapting it to general practice; the unfitneſs of veſſels, built merely for burthen, to carry a ſufficient force for defence, and the enormous expenditure attending it, has induced traders to riſk their property wholly upon a policy of inſurance, and underwriters upon a calculation of chances, rather than to truſt to the ſtrength of their ſhips, and the national ſpirit of their ſeamen; nor can it become their intereſt to alter this ſyſtem, whilſt the iron ſhip guns bear ſuch a diſproportion to the tonnage of the veſſels, and the inconveniences ariſing therefrom, render their force unequal to the end required.

GUNS for merchant ſervice, unleſs in ſome of the ſmall calibers, are generally made upon the ſame ſcale with thoſe deſigned for ſhips of war, though ſomewhat ſhorter; their equipment is the ſame, and they are charged in action with the ſame quantities of powder.—An attempt to reduce them to a ſcale calculated for mercantile defence, upon principles of abſolute ſafety and general utility may be ſuppoſed, without preſumption, to have engaged a ſhare of Carron company's attention, as immediately connected with that capital branch of their manufacture, having made above fourteen thouſand pieces of iron cannon within theſe laſt four years; and is now, with the utmoſt deference, offered to their many reſpectable correſpondents.

IT has been found, by a variety of experiments, and is fully eſtabliſhed by general experience, That caſt iron *may* be made of ſuch ſtrength as, when properly diſtributed in the conſtruction of guns, to ſuſtain the elaſtic ſhock of fired powder, equally well with braſs guns of the ſame calibers, weights, and dimenſions; and to reſiſt any ſtrain that can be given them with a free recoil, in proof or ſervice by muzzle charges, or inceſſant firing:—it is likewiſe a fact eſtabliſhed in projectiles, that one ſixth part of the weight of the ball in ſervice charge of powder, will carry its ſhot with the ſmalleſt incurvated line, or what is called point blank, to an object at a much greater diſtance (about 400 yards) than a Britiſh ſeaman would chuſe to engage; and with infinitely more velocity than is requiſite for the greateſt execution: ſuch guns then have every eſſential advantage for merchant ſervice, without ounterbalance, when judiciouſly managed.

The Light Guns, of which above one thouſand pieces are now in actual ſervice, are conſtructed upon the ſcale of the Britiſh government ſhip guns, though of conſiderably leſſer dimenſions, and the iron differently diſtributed; the lengths recommended for general uſe, are three diameters of the caliber *ſhorter* than the Britiſh thirty-two pounder gun, and the chace-guns one diameter *ſhorter*, which laſt has one hundred and one half of iron for each diameter of its caliber, the thirty-two pounder weighing forty-eight hundred, *&c. &c.* But guns of this conſtruction may alſo be made of any other given number of diameters of the caliber ſhorter or longer, and of proportionate weights; and ſome much ſhorter, and of one fourth leſs weight than here propoſed have been found to anſwer every purpoſe.

The carriages for the light guns of new conſtruction, ſhould be made correſpondently light, of well ſeaſoned timber, *good* workmanſhip, and neatly bolted; and the forepart cut to fit cloſe to the quick-work of the ſhip, and to take advantage of the length of the gun before the trunnions.—The ſervice-charge of powder ſhould not exceed one-ſixth of the weight of the ball for round, nor one twelfth for grape-ſhot, and need not be altered during action, as there is no danger of the guns heating, recoiling, or breaking their carriages, *&c.* ſo much as the heavier guns do in the uſual way of loading them; which will appear plain to every ſeaman upon the following compariſon, *viz.* a government 12 pounder gun of eighteen caliber diameters length, weighs about twenty-ſeven hundred weight, and is charged in action *till heated*, with one half the weight of the ball or ſix pounds of powder (though afterwards reduced to one third) which is three and half ounces of powder acting upon each hundred weight of iron in the gun; whereas the new-light conſtructed gun of ſame length, weighs nineteen hundred weight, and is charged with one ſixth of the weight of the ball, or two pounds of powder, which is not two ounces acting on each hundred weight of the iron of the gun.

MERCHANT SHIPS ſhould be armed with their full complement of guns of *one* caliber; even on the quarter-decks ter-decks of ſmaller veſſels, which are not equally ſtrong with their main-decks, guns reduced to the weight of the next lower caliber by diminiſhing their lengths, are greatly preferable to theſe of that lower caliber; and cohorns or ſwivel Carronades are more uſeful than ſwivel guns, when mounted upon the gunwales, gangways, quarters, tops, of large ſhips.—And Carronades (a new gun afterwards deſcribed) may be mounted on the quarter-deck or forecaſtle of frigate-built ſhips, of equal calibers with the guns on the main-deck; — and ſhips ſo armed, and manned with one fourth more Britiſh ſeamen than *fully* able to navigate them, eſpecially if fitted up with nettings againſt boarding, may be defended in moſt caſes from the attempts of all enemies privateers as now armed, or have an opportunity of being armed, in the preſent ſtate of founding iron guns in Europe.

By arming with theſe guns very little is abſtracted from the tonnage of the ſhip; little ſtrain in carrying or fighting them, either to the upper-works, carriages, ring-bolts, breachings, or tackles; no confuſion in action by a difference of charges, ſhot, wads, rammers, ladles, meaſures, *&c.* and the additional expenee of arming and navigating is in no compariſon with the premiums of inſurance upon unarmed veſſels, not to mention the advantages ariſing from the guns of larger calibers by their ſhot, with their proper charge of powder, ranging further than the ſmaller, nearly according to their ſeveral diameters; and when impelled with equal velocity, perforating ſolid bodies with a broader ſuperficial fracture, and penetrating deeper than in proportion to their weights:—and taking into no account the preſervation of national ſtrength, in ſecuring the ſervice of numberleſs brave ſeamen, that are taken by an enemy in unarmed veſſels.

GUNS of light conſtruction, are bored out of the ſolid, and being proved with the ſame charges of powder as the Britiſh ſhip guns, ſuſtain in theſe of ſame calibers and equal lengths, a greater ſtrain according to the difference of their reſpective weights, which is ſomewhat increaſed as the lengths are diminiſhed; the proofs are made at Carron under certificate, or at Woolwich, if required, and the guns are expeditiouſly delivered from the works to any port in Britain or Ireland.

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CARRON, *Dec.* 30, 1777.

20	Guns (Chace included) as recommended for Merchant ſervice,	4 prs.	weigh about	5¼	Tuns
20	do do	6 prs.		8¾	do
20	do do	9 do		13½	do
20	do do	12 do		17¾	do
20	do do	18 do		26½	do
20	do do	24 do		35½	do

WEIGHTS *of* 24 *Pounders*.

	C.	*qr.*	℔.
1ſt Shorteſt Gun	25	1	16
2d	27	2	0
3d	29	2	15
4th	31	3	0
5	33	3	14
6 Chace Guns	36	0	0

GUNS of proportionate lengths and weights to the above are made of all calibers, from the 1 pounder upwards.

Dec. 27, 1778. ABOVE 5000 guns of light conſtruction have been made at Carron ſince their introduction, which are now in actual ſervice; and the ſpirit of enterprize ſo conſpicuous in the mercantile gentlemen of the city of Glaſgow, never appeared with greater luſtre than in their exertions for the ſecurity of their commerce by arming with theſe guns: during the laſt war, there were few ſhips carrying guns, and not one privateer, belonging to Clyde; whereas there are now 2000 pieces of theſe guns, and many of them of large calibers, mounted on board their armed ſhips and privateers; all of which have, in action, fully anſwered expectation, with the allotment of powder recommended; and, to the honour of the maſters and ſeamen, no ſhips, upon the whole, have been fought with greater bravery, or more ably defended.

ANIMATED with the ſucceſs and utility of their ſpirited armaments, ſome of theſe gentlemen, of capital fortunes and extenſive connexions, expreſſed a deſire to bring into practice, a gun, ſtill ſhorter and lighter (which Carron Company had made for a particular purpoſe) as poſſeſſing ſome advantages for naval defence, that cannot be given to any guns now in uſe, on the common method of mounting and working them; and, this gun, upon trial, having been found to anſwer, the following is, with deference, offered as a deſcription of it.

THE Carronade is made ſo ſhort, that it is worked, with its carriage, in the ſhip's port; the trunnions lying immediately over the ſill of the port: it is correctly bored, and the ſhot being perfectly round, fills the caliber with ſuch exactneſs, that the leaſt poſſible of the impulſe of the powder eſcapes, upon exploſion, between the cylinder and the ſhot; which laſt alſo is thereby more truly directed in its flight: the bottom of the cylinder is a hemiſphere to which the end of the cartridge is not liable to ſtick, and in which the ſmalleſt charge of powder envelops the ſhot, exhauſting nearly the whole of its impelling force upon it: the trunnions are placed ſo as to leſſen the recoil, and that the gun cannot reſt againſt the ſides of the carriage, and is ballanced with the utmoſt facility: there are views caſt upon the vent and muzzle, to point the gun quickly to an object of 250 and 500 yards diſtance. There is an handle fixed upon the pommel-end of the gun, by which it is horizontally ranged, and pointed: and there is a ring caſt upon the caſcable, through which the breechin rope is reeved; the only rope uſed about theſe guns.

THE Carronade is mounted upon a carriage, with a perfectly ſmooth bottom of ſtrong plank, without trucks; inſtead of which there is fixed on the bottom of the carriage perpendicular from the trunnions, a gudgeon of proper ſtrength, with an iron waſher and pin at the lower end thereof, This gudgeon is let into a correſponding groove, cut in a ſecond carriage, called a ſlide-carriage; the waſher ſupported by the pin over-reaching the under-edges of the groove. This ſlide-carriage is made with a ſmooth upper ſurface, upon which the gun-carriage is moved, and by the gudgeon always kept in its right ſtation to the port; the groove in the ſlide-carriage being of a ſufficient length to allow the gun to recoil, and be loaded within board. The ſlide-carriage, the groove included, is equally broad with the fore part of the gun-carriage, and about four times the length; the fore part of the ſlide-carriage is fixed by hinge-bolts to the quick-work of the ſhip below the port, the end lying over the ſill, cloſe to the outſide plank, and the groove reaching to the fore end; the gudgeon of the gun-carriage, and conſequently the trunnions of the gun are over the ſill of the port, when the gun is run out: and the port is made of ſuch breadth, with its ſides bevelled off within board, that the gun and carriage may range from bow to quarter. The ſlide-carriage is ſupported from the deck at the hinder end, by a wedge or ſtep-ſtool; which being altered at pleaſure, and the fore end turning upon the hinge-bolts, the carriage can be conſtantly kept upon an horizontal plane, for the more eaſy and quick working of the gun when the ſhip lies along.

THE gun and carriages being in their places, the breechin rope, which muſt be ſtrong and limber, is reeved through the ring on the breech, then led through an eye-bolt drove downwards, the eye ſtanding upright upon the upper edge of each cheek of the gun-carriage; from theſe eye-bolts the ends of the breechin rope are ſeized down as uſual, to an eye-bolt drove into the quick-work on each ſide, in a line with the lower ſurface of the ſlide-carriage.

THE gun being mounted, and ready for action, is loaded with one twelfth part of the weight of its ball in ſervice charge of powder put into a woollen cartridge, and the end tied up with a rope-yarn, and placed next to the ſhot; and with a ſingle ball, well rammed home upon the powder, without a wadding between them; the gun being then run out in the port, is ranged and elevated with great facility, by means of the handle on the pommel; and, by the views, very quickly pointed: ----upon diſcharge,..the gun attempts to kick upwards, which being prevented by the waſher of the gudgeon bearing hard againſt the under part of the ſlide-carriage, the recoil takes place; and the gudgeon ſliding backwards in the groove, (the waſher ſtill bearing againſt an iron plate on the under edge of the groove) till the gun is brought up by the breechin rope, as much reaction ſucceeds as ſlackens the rope, ſo that the gun and carriage may be inſtantly turned fore and aft by the handle, and loaded again.

THIS gun has many ſingular advantages over the others of light conſtruction.---It is ſo extremely light that the ſmalleſt ſhips can carry the greateſt weight of ſhot (the 12 pounder weighing under five hundred weight, and the other calibers in proportion)

tion) and that without being attended with the inconveniences imputed generally to light guns, ſince it cannot injure its carriage, or jump out of its ſtation in the port upon recoil; and it will never heat.

IT can be eaſily managed and worked of all calibers, from the 12 pounders downwards, with two hands, and the 18 and 24 pounders with three hands. It may be readily ranged, pointed, and diſcharged twice in three minutes, which doubles the ſtrength of the ſhip againſt an enemy of equal force: it is wrought upon an horizontal plane to windward or to leeward, how much ſoever the ſhip lies along under a preſſure of ſail; and therefore, beſides being hampered with no tackles or other ropes, except the breechin rope, it may be worked with as much eaſe and expedition in chace or in a gale of wind, as in lying too for action.---It can be ranged from bow to quarter, ſo as to bring a broad-ſide to bear in a circuit of above ten points of the compaſs on each ſide.---It is no more expenſive in ammunition than the old guns of two-thirds leſs weight of ſhot; and it requires very few hands above the compliment neceſſary for navigating merchant-ſhips; and increaſes the ſtrength of privateers crews, by expoſing few hands at the guns, and augmenting the number at ſmall arms.

And, though the Carronade cannot, ſtrictly ſpeaking, throw its ſhot to an equal diſtance with a longer gun; yet, from the fitneſs of the ſhot to its cylinder, the powers of this gun will greatly ſurpaſs the expectations of ſuch as are not intimately acquainted with the effects of the elaſtic force of fired powder, ſince, with a twelfth part of the weight of its ball, at very ſmall elevations, it will range its ſhot to triple the diſtance ſhips generally engage, with ſufficient velocity for the greateſt execution, and with all the accuracy in its direction that can be attained from guns of greater lengths.

THERE have been two ſeeming diſadvantages imputed to this gun, which it does not merit, *viz.* the nicety of fitting the ſhot to the bore of the gun, and its incapacity to hold more than two ſhot at one charge; but, as ſeamen have few opportunities of confirming themſelves in juſt opinions by experiments made on ſhore, and cannot, in that caſe, be fully converſant with the ſubject; the following looſe hints may not be inept towards removing theſe objections.

IT is an axiom in projectiles, that a ſhot cannot be impelled from a gun to any diſtance in a direction truly parallel to the axis of the cylinder of the piece, or what is commonly called point blank, ariſing from ſeveral well known cauſes: for, however juſt may be the cylinder, and however perfect and ſmooth the ſphere of its correſponding ſhot; and, admitting that the impulſe of the powder acts through the center of gravity of the ſhot; and alſo, that the ſhot conſequently leaves the piece *in a direction parallel to the axis of its cylinder;* yet is the ſhot no ſooner diſcharged, but it becomes more or leſs inflected by its *gravity*, and deflected according to its velocity, by the *reſiſtance of the air and wind.*

THESE irregularities are of little importance in cloſe ſea-fights, and being the effect of natural cauſes, are common to all; beſides theſe, the deviation of a ſhot from its true direction, is further augmented by the windage between the cylinder and its ſhot; but the greateſt uncertainty in the flight of a ſhot, making allowance for the action of its gravity, and the airs reſiſtance, ſprings from the defects of the ſhot itſelf. Round ſhot for ſhip-guns, are ſeldom nicely examined;

and, when bought for the ſake of cheapneſs, from inaccurate workmen, at jobbing air-furnaces, are never perfect.

UNLESS a round ſhot be caſt, *ſolid, and truly globular*, and free of all hollows, roughneſs, and other outſide blemiſhes, and well fitted to the gun; it cannot EVEN *be diſcharged in the direction of the axis of the piece*, to the diſappointment of thoſe that uſe ſuch, and to the diſcredit of the gunfounder, however juſtly the piece is viewed, or diſparted; but being impelled againſt the ſurface of the cylinder, bounds and rebounds from ſide to ſide, and acquires a rotatory motion, and when caſt hollow withal, and breaking within the cylinder before diſcharge (which ſometimes happens, eſpecially with double charges) never fails to injure; and, when often repeated, may, at laſt, burſt the very beſt guns.----Round ſhot ſhould not be taken on board a ſhip, without being examined as to its ſhape and ſurface; gauged for its ſize to the caliber of the gun, and weighed that it be not above or below the ſtandard more than half an ounce in the pound of its reſpective caliber: good ſhot then, being of the ſame importance to all guns, removes the firſt objection.

IF the direction of the flight of a ſhot to its object, is affected by ſo many ſeemingly trivial cauſes, how much more uncertain muſt it be, when two or more ſhot are diſcharged together from one gun: for the ſhot next the powder being impelled with more celerity than that immediately before it, ſtrikes againſt it after diſcharge, and ſometimes ſhivers itſelf to pieces, and never fails to change obliquely the direction of both; and, this happens with round and double-headed, *&c.* and all double charges; and which, from their various figures, cannot reach an object at the ſame elevations with the round ſhot; eſpecially, when theſe other ſhots are of greater weight than the round, which is often the caſe.----However frightful a broadſide, with double charges, may appear at ſea, more confuſion is created by them, and more time loſt, *within board*, by the ſtrain and exceſſive recoil, than real damage done *without board*, by the additional charge: for, upon a trial on ſhore, where the effect can be traced, it will be found, that, at 100 yards diſtance, more ſhot will take place within a ſmall compaſs by ſingle than by double charges; and the charges will be oftener repeated, in a given time, without heating the gun: and theſe facts being eſtabliſhed, removes alſo the ſecond objection.

AMONGST the varieties of ſhot uſed for naval equipments, there ſeems to be few, that, upon principle, fully anſwer the purpoſes intended, and the expence for merchant ſhips: --- the kinds recommended are,

1*ſt*. THE round ſhot, caſt iron, from its figure, is beſt adapted for diſtant objects, from point blank to random ſhot; and ſhould always be diſcharged ſingly at all diſtances to which it is thought proper to be uſed.

2*d*. BARR SHOT, three diameters of the gun-caliber in length; the ſhank or bar of wrought iron, and the circles caſt: the weight of this ſhot ſhould be thrown into the bar, and the circles ought to be as light as poſſible, and truly caſt to fit the gun, as the purpoſe of this ſhot is for deſtroying maſts and rigging, at point blank and random ſhot, as well as at hand.

3*d*. DOUBLE-HEADED SHOT, two diameters of the gun-caliber in length, and all caſt iron; the weight of this ſhot ſhould alſo be thrown into the ſhank, and the circles truly round, and as light as poſſible. This ſhot is intended to take place of the round ſhot within point blank, or near at hand, where nice direction is not required, as it makes a larger fracture, and more ſplinters than the round ſhot.

4*th.* GRAPE SHOT, all caſt iron, a little more than one diameter of the gun's caliber in length: this ſhot is a compound or mixed ſhot, the ſtalk acting as a bar ſhot; the grape of this ſhot ſhould be as large as the caliber will admit, and well caſt: its purpoſes are ſufficiently known.

5*th.* CANISTER SHOT, caſt iron or leaden bullets, in plate-iron cylindrical caniſters: the purpoſes well known.

GRAPE and CANISTER SHOT may be ſingle, *viz.* the weight of the caliber, or double, that is one half more; when they are larger than that, they are ſeparated too ſoon after diſcharge: all the other ſhot ought to be the weight of the round ſhot as near as poſſible, and no heavier, eſpecially if they are to be charged with round ſhot in double charges.

THERE are other kinds of ſhot ſometimes uſed, *viz.* chain ſhot, ſliding ſhot, ſtar ſhot, and faggot ſhot, but they are dear; and, the chain ſhot excepted, ſeldom keep together to any diſtance from the gun; and even the chain ſhot falls ſhort of the execution expected, from one of the ſhot generally preceeding the other, in their flight, occaſioned by [illegible] ſmalleſt variation in their weights.

WITH reſpect to the ſervice-charges of powder, one ſixth of the weight of the ball has been recommended for the guns of light conſtruction, which is more than ſufficient, and one twelfth for the Carronades; but in caſe one twelfth is found, upon practice, to be too little for random ſhot, the charge may be one eighth or even one ſixth; only keeping in view that with the leſs velocity the ſhot penetrates thro' the ſide of a ſhip, the more dangerous is the fracture. Woollen cartridges, ſtitched together with worſted thread, are requiſite for the Carronades; and are more ſafe and expeditious for all guns, ſince they do not retain fire in the powder-chamber, and the gun needs no worming after diſcharge.----And though they are a little more expenſive at firſt, yet the preſerving the powder from ſcattering about in the magazine and upon the decks, the eaſe of drawing the charge intire, and the ſaving a wadding, overbalances the difference of price, was there no advantages gained in the uſe of them.

As much depends upon the Carronade and its carriages being juſtly adapted to each other, and well fitted in the port, the carriages, hinge-bolts, and other iron-work, are furniſhed by Carron Company with the guns, and proper directions given, with models for the ſize and bevel of the ports, and the manner of fitting the ſill to the ſlide-carriage: and the uſual equipment of ſhot is alſo ſent with the guns, unleſs more particular directions are given. —The equipment for each gun is,

	25	Rounds of Round Shot	
	15	Bar Shot	
	15	Double headed	
10		Single	Grape Shot
5	15	Double	
10		Single	Caniſter Shot
5	15	Double	

Guns, of government patterns, are made of all lengths and weights, now in uſe, either for navy or merchant-ſervice; guns of light conſtruction, are of two lengths, only, *viz.* the ſhort or ſide-gun, which is 15 diameters of its caliber long; and the chace-gun, which is 17 diameters: the Carronades are made of one length only for each caliber.

APPENDIX

TO

Doctor JAMES LIND's

DESCRIPTION

OF

Riffled ORDNANCE.

PROOFS

OF

ORDNANCE

Caſt by the CARRON COMPANY, in SCOTLAND.

PROOF I.

TWenty-four CARRON Guns made for Spain, *viz.* ſix 24, ſix 18, ſix, 12, two 8, two 6, and two 4 pounders, which had ſtood the Spaniſh proof, ſuſtained each at Ferrol, in June 1774, ſixty rounds, fired [illegible]rriages, at intervals of two minutes, [illegible] the [illegible]mmon ſervice-charge, in the following manner:

1. { 12 Rounds, Horizontal.
   2 with bar ſhot do

2. { 12 Rounds elevatsd 3 Degrees
   2 with bar ſhot do

3. { 13 Rounds elevated 6 Degrees
   3 with bar ſhot do

4. { 13 Rounds elevated 8 Degrees
   3 with bar ſhot do

The charge calibers, after the fortieth round, became very much heated, and were refreſhed with tallow, till the end of the firing, at which time they became ſo hot, that a man could not hold his hand upon them. The guns all ſtood, and were accepted, as fit for ſervice.

The Spaniſh proof for iron ordnance is the ſtrongeſt in Europe, and the guns of the ſmalleſt dimenſions. The guns are placed with their breeches againſt a parapet, made in a ſloping ditch of earth, and ſtrongly fortified with plank and piling, on purpoſe to prevent recoil, and ſtaked down at the trunnions, to prevent reaction, with their muzzles elevated 22½ degrees. Each caliber is fired three times, the large ones, namely, 24 and 18 pounders, firſt with a charge of powder the weight of the ball, the ſecond three fourths, [illegible] the third with two thirds of its wei[illegible] and a ſingle ball each time. Thoſe ſmaller calibers, are fired three times, with a charge of powder the weight of the ball, and a ſingle ſhot each time.

The Carron guns ſent to Spain have undergone the ſevereſt trials, particularly at Algiers, where the St. Joſepha, a ſeventy-four gun ſhip, was ſent in to ſilence a battery, and, by her rigging being diſabled, ſhe could not for a long time be got off again, in which ſituation ſhe kept up an uninterrupted fire for 12 hours, and diſcharged every gun 80 times; ſhe was mounted with Carron guns, all of which appeared as good after the engagement as before it.

PROOF II.

Proof made at Woolwich, by order of the Honourable Board of Ordnance, under the inſpection of General Williamſon, of ſix Carron guns, viz. two 24, two 18, and two 12 pounders.

Firſt the Ordnance Proof, and then on their Carriages;

2.	Two 24 *pr.*	15 rounds,	12 lb	powder,	and 1 ball.
	Two 18	15	do 9	do	do
	Two 12	15	do 6	do	do

At intervals of five minutes.

3.	Two 24 *pr.*	15	rounds,	11	℔ powder, aud	1 ball.
	Two 18	15	do	8	do	do
	Two 12	15	do	5	do	do

At intervals of ſix minutes.

4.	Two 24 *pr.*	15	rounds,	10	℔ powder, and	1 ball.
	Two 18	15	do	7	do	do
	Two 12	15	do	4	do	do

At intervals of ſeven minutes.

Then,

5.	Two 24 *pr.*	1	round,	12	℔ powder, and	5 balls.
	Two 18	1	do	9	do	do
	Two 12	1	do	6	do	do

And then

The following full to the Muzzle.

6.	Two 24 *pr.*	1	round,	12	℔ powder, and	11 balls.
	Two 18	1	do	9	do	do
	Two 12	1	do	6	do	do

Stood all, ſearched ſound, and every way fit for ſervice.

PROOF III.

PROOF of three Carron guns, viz. two 12, and one 18 pounder, proved by the proof-maſter at Carron, in preſence of ſeveral gentlemen, and certified before Sir Michael Bruce, Bart. one of his Majeſty's Juſtices of Peace for the ſhire of Stirling.

1.	Two 12 *pr.*	2	rounds,	12	℔ powder, and	1 ball.
	One 18	2	do	16	do	do

2.	Two 12 *pr.*	2	rounds,	6	℔ powder, and	2 balls.
	One 18	2	do	9	do	do

3.	Two 12 *pr.*	2	rounds,	6	℔ powder, and	5 balls.
	One 18	2	do	9	do	do

The following full to the Muzz[illegible]

4.	Two 12 *pr.*	1 round,	6 ℔ powder,	a[illegible]
	One 18	1 do	9 do	[illegible] do
5.	Two 12 *pr.*	1 round,	12 ℔ powder,	and [illegible]
	One 18	1 do	16 do	[illegible]
6.	Two 12 *pr.*	7 rounds,	6 ℔ powder,	and 11 balls.
	One 18	7 do	9 do	do
7.	Two 12 *pr.*	2 rounds,	12 ℔ powder,	and 9 balls.
	One 18	2 do	16 do	do

Then one of the 12 pounders was bored up to the caliber of an 18 pounder, and the 18 pounder to that of a 24 pounder; the three guns then ſustained the following proof, in preſence of Sir Michael Bruce, Bart. Alexander Frazer, Eſq; of Strichen, and myſelf, viz.

8.	The 12 *pr.*	1 round,	6 ℔ powder,	and 11 balls.
	Bored up do	1 do	9 do	5 18 *pr.* do
	do 18 *pr.*	1 do	12 do	5 24 *pr.* do

The following all full to the Muzzle.

9.	The 12 *pr.*	2 rounds,	6 ℔ powder,	and 11 balls.
	Bored up do	2 do	9 do	9 18 *pr.* do
	do 18 *pr.*	2 do	12 do	10 24 *pr.* do

A Junk Wadding was put in above every ball; the guns all ſound, and ring as well as at firſt. The gentlemen at Carron afterwards made the 12 pounder, which was bored up to an 18 pounder, undergo a further proof of eight rounds to the muzzle each time, with nine pound of [illegible]wder, and nine 18 pounder balls, and [illegible]ontinues ſtill as ſound as at the [illegible]g. The bored up guns recoiled [illegible]et, plowing up the ground all the [illegible] behind them. This proof was finiſhed the 18th of April, 1776.

	T.	C.	qr.	℔.
The bored up 12 powder is 7½ feet long, and weighed before it was bored up	1	9	1	0
When bored up to an 18 pounder, it weighed	1	8	1	0
Lighter than when it ſtood the firſt 16 rounds, as a 12 pounder,	0	1	0	0
The bored up 18 pounder is 9 feet long, and weighed before it was bored up	2	0	0	0
When bored up to a 24 pounder, it weighed	1	16	1	4
Lighter than when it ſtood the firſt 16 rounds, as an 18 pounder,	0	3	2	24
An 18 pounder of 9 feet, Government ordnance pattern, weighs	2	0	0	0
The 18 pounder bored up from a 12 pounder of 7½ feet long, Government ordnance pattern, weighs	1	8	1	0
Lighter than a Government ordnance 18 pounder	0	11	3	0
The 24 pounder of 9½ feet long, Government ordnance pattern, weighs	2	9	0	0
The 24 pounder bored up from an 18 pounder of 9 feet, Government ordnance pattern, weighs	1	16	1	4
Lighter than a Government ordnance 24 pounder	0	12	2	24

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PROC

Copy Report
at Woolwich, Augu
24, two 18, and two g
in obedience to the Right Honourable,
and Honourable Boards order the 1ſt inſtant.

After the guns were twice proved in the uſual manner by the proof-maſters, each gun was fired 45 times, with the following quantities of powder, and one ſhot each time, viz.

Two 24 *pr.* 15 rounds with 11 lb powder, 15 rounds with 10 lb, and 15 do with 9 lb.

Two 18 *pr.* 15 rounds with 9 lb powder, 15 rounds with 8 lb. and 15 do. with 7 lb.

Two 12 *pr.* 15 rounds with 6 lb powder, 15 rounds with 5 lb. and 15 do. with 5 lb.

Five minutes were allowed between each of the firſt twenty rounds, and two minutes and an half between each of the other twenty-five rounds; they were then fired with the uſual quantity of powder for proof, and the following quantity of ſhot in each gun, with a junk-wad, well rammed home, between each ſhot, viz. in each of the 24 pounders 9 ſhot; in one of the 18 pounders 9 ſhot, and in the other 7; in one of the 12 pounders 9, and in the other 8 ſhot: none of the guns could contain another ſhot, and the 12 pounders were quite full to the muzzle.

One

[illegible] e 18 pounders, which [illegible] a 12 pounder, was [illegible] quantities of powder [illegible] ounder.

AFT[illegible] bove trial was made, the guns were carefully ſearched, and not the leaſt flaw or defect was found in any of them.

N. B. 16 Guns were proved, and the abovementioned ſix were taken promiſcuouſly from them, and the trial commenced immediately after the proof.

P. S. The 18 pounder bored up from a 12 pounder weighed 1 Tun 8 hundred and 1 quarter.

At STENHOUSE,

The firſt day of July, *one thouſand ſeven hundred and ſeventy-eight years.*

IN preſence of Sir Michael Bruce, of Stenhouſe, Bart. one of his Majeſty's Juſtices of the Peace of the County of Stirling, compeared Alexander Gunn, Clerk and Proof Maſter to Carron Company, who, being ſolemnly ſworn, maketh Oath, That a gun of 24 pounder caliber, of Spaniſh conſtruction, No. 13543, was proved at Carron as follows, viz.

ON Monday, the 15th of the month of June, the gun was placed in a proof bank, nearly level, and was charged, firſt with twenty-four pound of powder, and one ball, with a junk wadding between

the charge and the
fore the ſhot, well
Second, with eigh
and one ball, wit
placed and ramme
with ſixteen pound o
ball, alſo with two junk waddings plac
and rammed as before.——The ſtrength of the caſk of powder with which the aforeſaid proofs were made, being previouſly tried from a mortar, with a chamber, holding four ounces of powder, and carrying a ball, weighing fifty-two pound weight, at an elevation of forty-five degrees, when four ounces of powder threw the ball to the diſtance of one hundred and twenty-three yards.

THAT immediately thereafter the aforeſaid proofs, the ſaid gun was charged and fired twice with twelve pound of powder of the ſame quality and ſtrength, and with eleven twenty-four pound balls and twelve junk wads, one between the powder and the firſt ball, and one before each ball, all properly rammed home.

THAT next day, Tueſday the 16th ultimo, the ſame gun being previouſly bored up to the caliber of a Britiſh thirty-two pounder gun, was again charged and fired with twelve pound of powder, and eleven thirty-two pound balls and twelve junk waddings as before.

[illegible] day the 22d ultimo, the [illegible] charged and fired [illegible] powder and eleven [illegible]s, and twelve junk [illegible] days.

[illegible]HA[illegible] hurſday the 25th ultimo, the aforeſaid gun was again proved with twenty-four pound of powder and a thirty-two pound ball, in ſame manner as on Monday the 15th.

THAT thereafter the aforeſaid gun was charged and fired with twenty-four pound of powder and nine thirty-two pound balls, and ten junk wads being rammed as uſual, and filling the caliber of the gun to the muzzle, and with which diſcharge the gun recoiled forty-four feet.

THAT, in the courſe of theſe ſeveral proofs, the ſtrength of the powder was proved; and it appeared to be of the ſame quality.

THAT, immediately after the laſt proof, the ſaid gun was tried and ſearched, and appeared perfectly ſound; and the deponent verily believes her to be fit in every reſpect for actual ſervice. And that this is the truth, as he ſhall anſwer to GOD.

20 JY 64

ALEXANDER GUNN,
MICH. BRUCE, J. P.

N. B. The weight of the Gun, after being bored up to a 32 *pr.* is 2 Tuns 7 hundred weight.